



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 20, 2025 – 01:11 PM EDT

PDB ID : 4JZW  
Title : Crystal structure of CD4-mimetic miniprotein M48U1 in complex with HIV-1 YU2 gp120 in P212121 space group  
Authors : Acharya, P.; Kwong, P.D.  
Deposited on : 2013-04-03  
Resolution : 1.78 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.4

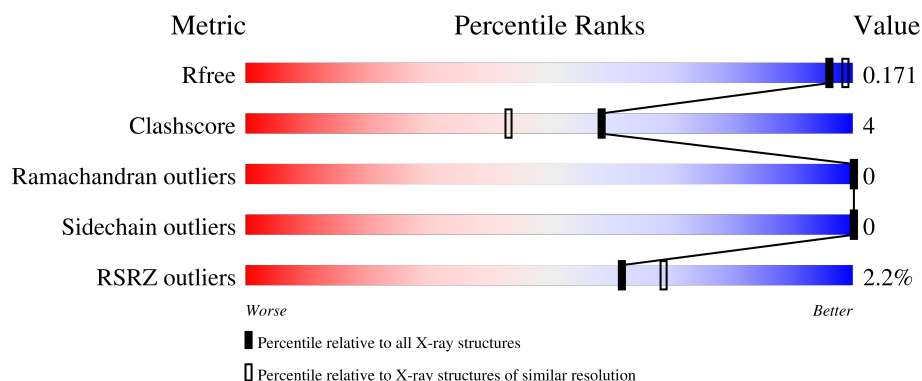
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.78 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	164625	1191 (1.78-1.78)
Clashscore	180529	1282 (1.78-1.78)
Ramachandran outliers	177936	1270 (1.78-1.78)
Sidechain outliers	177891	1270 (1.78-1.78)
RSRZ outliers	164620	1191 (1.78-1.78)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	376	 2% 83% 6% 11%
1	G	376	 % 82% 8% 10%
2	M	28	 7% 93% 7%
2	R	28	 7% 93% 7%

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 7061 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called HIV-1 YU2 gp120 glycoprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	336	Total	C	N	O	S	0	14	0
			2678	1681	466	511	20			
1	G	339	Total	C	N	O	S	1	21	0
			2718	1702	467	524	25			

- Molecule 2 is a protein called CD4-MIMETIC MINIPROTEIN M48U1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	M	28	Total	C	N	O	S	0	0	1
			209	133	38	32	6			
2	R	28	Total	C	N	O	S	0	3	1
			222	144	39	33	6			

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	G	1	Total	C	N	O	0	0
			14	8	1	5		
3	G	1	Total	C	N	O	0	0
			14	8	1	5		
3	G	1	Total	C	N	O	0	0
			14	8	1	5		
3	G	1	Total	C	N	O	0	0
			14	8	1	5		
3	G	1	Total	C	N	O	0	0
			14	8	1	5		
3	G	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 4 is ISOPROPYL ALCOHOL (three-letter code: IPA) (formula: C<sub>3</sub>H<sub>8</sub>O).



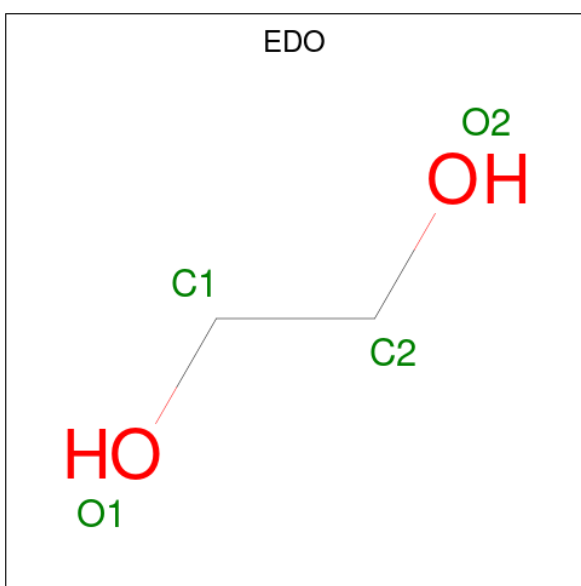
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	3	1		
4	A	1	Total	C	O	0	0
			4	3	1		
4	A	1	Total	C	O	0	0
			4	3	1		
4	A	1	Total	C	O	0	0
			4	3	1		
4	A	1	Total	C	O	0	0
			4	3	1		
4	G	1	Total	C	O	0	0
			4	3	1		
4	G	1	Total	C	O	0	0
			4	3	1		
4	G	1	Total	C	O	0	0
			4	3	1		

- Molecule 5 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	O	S	0	0
			5	4	1		
5	G	1	Total	O	S	0	0
			5	4	1		

- Molecule 6 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula:  $C_2H_6O_2$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	G	1	Total	C	O	0	0
			4	2	2		

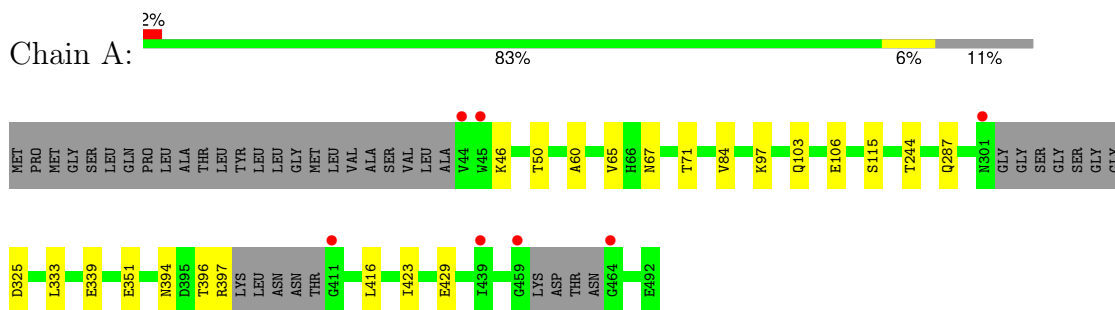
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	450	Total 450	O 450	0	0
7	G	441	Total 441	O 441	0	0
7	M	22	Total 22	O 22	0	0
7	R	23	Total 23	O 23	0	0

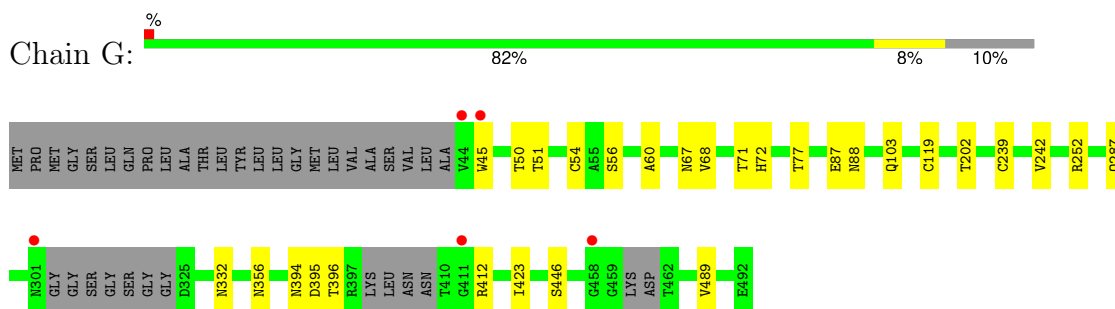
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

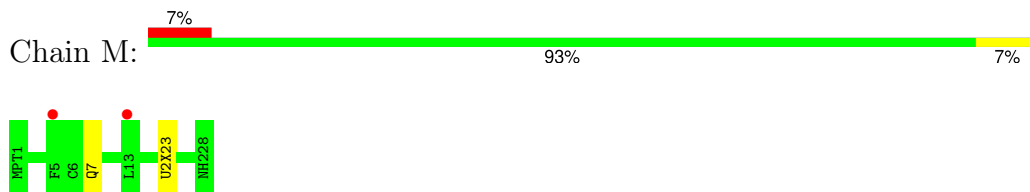
- Molecule 1: HIV-1 YU2 gp120 glycoprotein



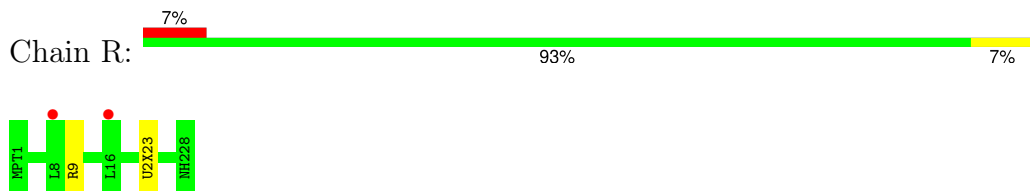
- Molecule 1: HIV-1 YU2 gp120 glycoprotein



- Molecule 2: CD4-MIMETIC MINIPROTEIN M48U1



- Molecule 2: CD4-MIMETIC MINIPROTEIN M48U1





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	63.65Å 78.01Å 163.25Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.66 – 1.78 24.66 – 1.78	Depositor EDS
% Data completeness (in resolution range)	82.7 (24.66-1.78) 77.5 (24.66-1.78)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.09	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.08 (at 1.78Å)	Xtriage
Refinement program	PHENIX (phenix.refine: dev_755)	Depositor
R, $R_{free}$	0.164 , 0.209 0.175 , 0.171	Depositor DCC
$R_{free}$ test set	3267 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	24.1	Xtriage
Anisotropy	0.368	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 51.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	7061	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 91.41 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.5100e-08. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, EDO, NAG, IPA, NH2, DPR, MPT, U2X

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	0.43	0/2797	0.56	0/3796
1	G	0.43	0/2879	0.56	0/3908
2	M	0.38	0/176	0.63	0/231
2	R	0.42	0/199	0.50	0/261
All	All	0.43	0/6051	0.56	0/8196

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2678	0	2611	19	0
1	G	2718	0	2643	25	0
2	M	209	0	212	1	0
2	R	222	0	237	1	0
3	A	140	0	130	5	0
3	G	112	0	104	2	0
4	A	20	0	40	1	0
4	G	12	0	24	2	0
5	A	5	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	G	5	0	0	1	0
6	G	4	0	6	0	0
7	A	450	0	0	11	0
7	G	441	0	0	10	0
7	M	22	0	0	1	0
7	R	23	0	0	0	0
All	All	7061	0	6007	52	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (52) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:503:NAG:H83	3:A:503:NAG:H3	1.59	0.84
1:G:54:CYS:O	7:G:1023:HOH:O	2.04	0.74
1:A:106[A]:GLU:OE2	7:A:851:HOH:O	2.04	0.73
1:A:351:GLU:OE1	7:A:860:HOH:O	2.06	0.72
1:A:394:ASN:O	7:A:928:HOH:O	2.12	0.68
4:A:516:IPA:H12	2:R:9:ARG:HE	1.60	0.66
1:G:356[A]:ASN:ND2	7:G:910:HOH:O	2.29	0.65
1:A:429:GLU:OE1	7:A:991:HOH:O	2.15	0.65
1:G:252:ARG:NH1	7:G:681:HOH:O	2.32	0.61
1:G:412:ARG:NH1	7:G:981:HOH:O	2.34	0.60
1:G:119:CYS:O	1:G:202[A]:THR:HG23	2.06	0.56
1:G:423:ILE:N	5:G:513:SO4:O2	2.39	0.55
3:A:503:NAG:H3	3:A:503:NAG:C8	2.33	0.55
1:G:394:ASN:ND2	3:G:507:NAG:O7	2.38	0.55
1:G:45:TRP:HB2	1:G:489[B]:VAL:CG1	2.36	0.55
1:A:325:ASP:N	7:A:918:HOH:O	2.39	0.55
2:M:7:GLN:OE1	7:M:204:HOH:O	2.19	0.53
1:A:97:LYS:NZ	7:A:1004:HOH:O	2.42	0.53
3:A:503:NAG:H2	7:A:997:HOH:O	2.10	0.52
1:G:446:SER:O	4:G:511:IPA:H31	2.10	0.51
1:A:71[A]:THR:HG22	7:A:715:HOH:O	2.08	0.51
1:G:45:TRP:HB2	1:G:489[B]:VAL:HG11	1.89	0.51
1:G:50:THR:O	1:G:103:GLN:NE2	2.38	0.50
3:A:503:NAG:C1	3:A:503:NAG:H82	2.41	0.50
1:G:71[A]:THR:HG22	7:G:660:HOH:O	2.12	0.50
1:A:46:LYS:NZ	7:A:1046:HOH:O	2.43	0.49
1:A:423:ILE:N	5:A:513:SO4:O2	2.44	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:60:ALA:HA	1:G:71[A]:THR:HG21	1.95	0.48
1:A:60:ALA:HA	1:A:71[A]:THR:HG21	1.95	0.47
1:A:287:GLN:NE2	7:A:759:HOH:O	2.41	0.47
3:G:508:NAG:HN2	4:G:511:IPA:H11	1.81	0.46
1:G:87[A]:GLU:OE2	7:G:986:HOH:O	2.21	0.46
1:G:68:VAL:O	1:G:71[A]:THR:OG1	2.30	0.46
1:A:396:THR:O	1:A:397:ARG:HB3	2.16	0.46
1:G:287:GLN:NE2	7:G:715:HOH:O	2.47	0.46
1:G:72:HIS:ND1	7:G:1003:HOH:O	2.34	0.45
1:G:88:ASN:ND2	7:G:934:HOH:O	2.49	0.44
1:G:239[A]:CYS:SG	1:G:242:VAL:HG22	2.58	0.44
1:G:332:ASN:ND2	7:G:919:HOH:O	2.51	0.44
1:A:333:LEU:CD2	1:A:416[A]:LEU:HD11	2.48	0.44
1:G:50:THR:OG1	1:G:51:THR:N	2.51	0.43
1:G:67:ASN:O	1:G:71[A]:THR:HG23	2.18	0.43
1:A:50:THR:O	1:A:103:GLN:NE2	2.41	0.43
1:A:67:ASN:O	1:A:71[A]:THR:HG23	2.19	0.42
1:A:339:GLU:OE2	7:A:977:HOH:O	2.22	0.42
1:G:45:TRP:CD1	1:G:489[B]:VAL:HG11	2.55	0.41
1:A:65:VAL:HB	1:A:115:SER:HB3	2.02	0.41
1:G:56:SER:C	1:G:77[B]:THR:HG23	2.41	0.40
1:A:84:VAL:HB	1:A:244[A]:THR:CG2	2.51	0.40
1:G:395:ASP:OD1	1:G:396:THR:N	2.55	0.40
3:A:503:NAG:C8	3:A:503:NAG:C1	2.99	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	341/376 (91%)	335 (98%)	6 (2%)	0	<b>100</b> <b>100</b>

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	G	353/376 (94%)	343 (97%)	10 (3%)	0	100	100
2	M	24/28 (86%)	23 (96%)	1 (4%)	0	100	100
2	R	27/28 (96%)	27 (100%)	0	0	100	100
All	All	745/808 (92%)	728 (98%)	17 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	310/328 (94%)	310 (100%)	0	100	100
1	G	322/328 (98%)	322 (100%)	0	100	100
2	M	20/20 (100%)	20 (100%)	0	100	100
2	R	23/20 (115%)	23 (100%)	0	100	100
All	All	675/696 (97%)	675 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

4 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The

Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	U2X	R	23	2	19,20,21	1.70	3 (15%)	20,25,27	0.99	2 (10%)
2	U2X	M	23	2	19,20,21	1.75	3 (15%)	20,25,27	0.90	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	U2X	R	23	2	-	2/10/19/21	0/2/2/2
2	U2X	M	23	2	-	2/10/19/21	0/2/2/2

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	M	23	U2X	CE2-CD2	4.69	1.46	1.38
2	R	23	U2X	CE2-CD2	4.05	1.45	1.38
2	R	23	U2X	CE1-CD1	3.99	1.45	1.38
2	M	23	U2X	CE1-CD1	3.80	1.45	1.38
2	M	23	U2X	CB-CA	-2.69	1.48	1.53
2	R	23	U2X	CB-CA	-2.44	1.48	1.53

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	R	23	U2X	C1-C2-C3	-2.10	107.67	112.08
2	R	23	U2X	OH-C7-C3	2.09	115.11	108.73

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	R	23	U2X	CE1-CZ-OH-C7
2	R	23	U2X	CE2-CZ-OH-C7
2	M	23	U2X	CE1-CZ-OH-C7
2	M	23	U2X	CE2-CZ-OH-C7

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

29 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
3	NAG	G	506	1	14,14,15	0.26	0	17,19,21	0.61	0
3	NAG	A	502	1	14,14,15	0.52	0	17,19,21	0.42	0
5	SO4	G	513	-	4,4,4	0.26	0	6,6,6	0.27	0
4	IPA	A	511	-	3,3,3	0.60	0	3,3,3	0.22	0
4	IPA	G	511	-	3,3,3	0.59	0	3,3,3	0.19	0
3	NAG	A	503	1	14,14,15	0.29	0	17,19,21	0.76	0
3	NAG	A	501	1	14,14,15	0.85	1 (7%)	17,19,21	0.71	1 (5%)
3	NAG	A	507	1	14,14,15	0.37	0	17,19,21	0.49	0
4	IPA	A	515	-	3,3,3	0.57	0	3,3,3	0.20	0
4	IPA	G	509	-	3,3,3	0.56	0	3,3,3	0.18	0
4	IPA	A	512	-	3,3,3	0.58	0	3,3,3	0.29	0
3	NAG	A	514	1	14,14,15	0.23	0	17,19,21	0.40	0
3	NAG	G	507	1	14,14,15	0.45	0	17,19,21	0.43	0
3	NAG	G	505	1	14,14,15	0.28	0	17,19,21	0.46	0
5	SO4	A	513	-	4,4,4	0.25	0	6,6,6	0.25	0
3	NAG	G	503	1	14,14,15	0.43	0	17,19,21	0.41	0
3	NAG	A	504	1	14,14,15	0.33	0	17,19,21	0.37	0
3	NAG	A	508	1	14,14,15	0.26	0	17,19,21	0.48	0
6	EDO	G	512	-	3,3,3	0.41	0	2,2,2	0.33	0
3	NAG	G	501	1	14,14,15	0.32	0	17,19,21	0.44	0
3	NAG	G	502	1	14,14,15	0.29	0	17,19,21	0.53	0
3	NAG	A	509	1	14,14,15	0.28	0	17,19,21	0.41	0
4	IPA	A	510	-	3,3,3	0.54	0	3,3,3	0.17	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	IPA	G	510	-	3,3,3	0.57	0	3,3,3	0.18	0
3	NAG	G	504	1	14,14,15	0.30	0	17,19,21	0.39	0
3	NAG	A	505	1	14,14,15	0.50	0	17,19,21	0.60	0
3	NAG	G	508	1	14,14,15	0.26	0	17,19,21	0.42	0
3	NAG	A	506	1	14,14,15	0.20	0	17,19,21	0.38	0
4	IPA	A	516	-	3,3,3	0.58	0	3,3,3	0.14	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	G	506	1	-	0/6/23/26	0/1/1/1
3	NAG	A	502	1	-	0/6/23/26	0/1/1/1
3	NAG	A	503	1	-	6/6/23/26	0/1/1/1
3	NAG	A	501	1	-	0/6/23/26	0/1/1/1
3	NAG	A	507	1	-	2/6/23/26	0/1/1/1
3	NAG	A	514	1	-	0/6/23/26	0/1/1/1
3	NAG	G	507	1	-	4/6/23/26	0/1/1/1
3	NAG	G	505	1	-	1/6/23/26	0/1/1/1
3	NAG	G	503	1	-	0/6/23/26	0/1/1/1
3	NAG	A	504	1	-	0/6/23/26	0/1/1/1
6	EDO	G	512	-	-	1/1/1/1	-
3	NAG	A	508	1	-	0/6/23/26	0/1/1/1
3	NAG	G	501	1	-	0/6/23/26	0/1/1/1
3	NAG	G	502	1	-	0/6/23/26	0/1/1/1
3	NAG	A	509	1	-	0/6/23/26	0/1/1/1
3	NAG	G	504	1	-	2/6/23/26	0/1/1/1
3	NAG	A	505	1	-	0/6/23/26	0/1/1/1
3	NAG	G	508	1	-	0/6/23/26	0/1/1/1
3	NAG	A	506	1	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	501	NAG	C1-C2	2.71	1.56	1.52

All (1) bond angle outliers are listed below:



Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
3	A	501	NAG	C1-O5-C5	2.21	115.15	112.19

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	G	507	NAG	C3-C2-N2-C7
3	G	507	NAG	O5-C5-C6-O6
3	G	504	NAG	O5-C5-C6-O6
3	G	507	NAG	C4-C5-C6-O6
3	G	504	NAG	C4-C5-C6-O6
3	A	503	NAG	C8-C7-N2-C2
3	A	503	NAG	O7-C7-N2-C2
3	A	507	NAG	O5-C5-C6-O6
3	A	503	NAG	O5-C5-C6-O6
3	A	503	NAG	C4-C5-C6-O6
6	G	512	EDO	O1-C1-C2-O2
3	G	507	NAG	C1-C2-N2-C7
3	A	507	NAG	C4-C5-C6-O6
3	A	503	NAG	C3-C2-N2-C7
3	G	505	NAG	O5-C5-C6-O6
3	A	503	NAG	C1-C2-N2-C7

There are no ring outliers.

7 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	G	513	SO4	1	0
4	G	511	IPA	2	0
3	A	503	NAG	5	0
3	G	507	NAG	1	0
5	A	513	SO4	1	0
3	G	508	NAG	1	0
4	A	516	IPA	1	0

## 5.7 Other polymers

There are no such residues in this entry.

## 5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	336/376 (89%)	-0.15	7 (2%) 63 70	19, 31, 58, 110	13 (3%)
1	G	339/376 (90%)	-0.14	5 (1%) 71 77	13, 31, 59, 110	20 (5%)
2	M	24/28 (85%)	0.74	2 (8%) 19 22	27, 52, 73, 84	0
2	R	24/28 (85%)	0.61	2 (8%) 19 22	25, 46, 59, 60	3 (12%)
All	All	723/808 (89%)	-0.09	16 (2%) 62 69	13, 31, 60, 110	36 (4%)

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	459	GLY	4.6
1	A	464	GLY	4.3
1	G	44	VAL	4.1
2	M	5	PHE	3.5
2	R	16[A]	LEU	3.1
1	G	411	GLY	2.9
1	G	45	TRP	2.8
2	R	8	LEU	2.7
1	A	45	TRP	2.7
1	A	44	VAL	2.6
1	A	301	ASN	2.4
1	A	439	ILE	2.4
2	M	13	LEU	2.3
1	G	301	ASN	2.2
1	A	411	GLY	2.2
1	G	458	GLY	2.2

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	U2X	R	23	19/20	0.94	0.08	21,25,34,36	0
2	U2X	M	23	19/20	0.95	0.07	22,26,32,34	0
2	DPR	M	21	7/8	0.98	0.04	25,26,28,29	0
2	DPR	R	21	7/8	0.98	0.04	22,25,26,27	0

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	NAG	A	501	14/15	0.36	0.15	118,126,131,132	0
3	NAG	G	507	14/15	0.68	0.13	102,119,122,126	0
3	NAG	A	506	14/15	0.80	0.11	51,60,79,90	0
3	NAG	A	504	14/15	0.80	0.10	50,58,63,69	0
4	IPA	A	511	4/4	0.80	0.16	46,51,52,54	0
4	IPA	A	516	4/4	0.80	0.16	68,71,73,74	0
3	NAG	G	501	14/15	0.81	0.09	49,56,66,67	0
3	NAG	G	504	14/15	0.83	0.10	57,66,82,90	0
4	IPA	A	515	4/4	0.83	0.17	80,80,82,84	0
3	NAG	A	503	14/15	0.83	0.12	59,67,74,74	0
6	EDO	G	512	4/4	0.83	0.10	62,62,64,65	0
3	NAG	G	508	14/15	0.84	0.09	45,57,72,76	0
4	IPA	G	511	4/4	0.85	0.16	62,63,69,79	0
3	NAG	A	514	14/15	0.86	0.09	59,65,68,69	0
3	NAG	A	507	14/15	0.87	0.10	48,58,68,72	0
3	NAG	G	506	14/15	0.88	0.10	35,48,60,69	0
3	NAG	A	508	14/15	0.89	0.09	40,61,68,71	0
4	IPA	A	512	4/4	0.89	0.12	41,46,46,47	0
3	NAG	A	509	14/15	0.89	0.08	49,58,65,67	0
4	IPA	G	509	4/4	0.90	0.10	32,36,39,46	0
4	IPA	G	510	4/4	0.90	0.10	36,42,44,47	0
3	NAG	G	505	14/15	0.91	0.08	49,53,71,75	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	SO4	A	513	5/5	0.92	0.20	26,32,35,55	5
4	IPA	A	510	4/4	0.92	0.08	37,41,41,49	0
3	NAG	A	502	14/15	0.95	0.08	30,33,47,53	0
3	NAG	G	502	14/15	0.95	0.07	29,35,44,45	0
3	NAG	G	503	14/15	0.95	0.08	29,33,45,46	0
5	SO4	G	513	5/5	0.96	0.10	26,30,31,45	5
3	NAG	A	505	14/15	0.96	0.06	27,30,42,46	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.